



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,526	03/29/2004	Kong Weng Lee	70030845-1	3297
57299	7590	11/07/2007		
Kathy Manke Avago Technologies Limited 4380 Ziegler Road Fort Collins, CO 80525			EXAMINER MAKIYA, DAVID J	
			ART UNIT 2885	PAPER NUMBER
			NOTIFICATION DATE 11/07/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

avagoip@system.foundationip.com  
kathy.manke@avagotech.com  
scott.weitzel@avagotech.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/812,526	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> David J. Makiya	<b>Art Unit</b> 2885	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 02 July 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5, 8-12, 15-19 and 22-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 8-12, 15-19 and 22-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/02/2007 has been entered.

### ***Terminal Disclaimer***

The terminal disclaimer filed on 07/02/2007 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Patent Application 10/669,986 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 8, 15-18, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeager et al. (US Patent 6,507,049) in view of Haitz (US Patent 3,780,357).

Art Unit: 2885

With respect to claim 1, Yeager et al. teaches a light emitting diode package comprising a one piece ceramic substrate 17 and cup 19 for mounting a light emitting diode 4, the one piece ceramic substrate and cup formed from an opaque ceramic material (Column 10, Lines 28-30) and defining a cavity with a ceramic sidewall (Column 10, Lines 28-30), wherein the cavity is shaped to focus light in a predetermined direction (Figure 2), and a metallic coating 21 on a portion of the ceramic substrate for reflecting light in a predetermined direction (Column 10, Lines 33-35).

However, Yeager et al. fails to teach the sidewalls of the cavity being vertical.

Haitz teaches a light emitting diode package (Figure 4) with a ceramic substrate (16, 18; Column 4, Lines 58-60) for mounting a light emitting diode 12, the substrate defining a cavity with reflective, vertical sidewalls 21 shaped to focus light in a predetermined direction (Figures 3A and 4), where the reflecting surface is a metallic coating (Column 5, Lines 6-9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yeager et al. with the teachings of Haitz because a cavity with vertical sidewalls would emit light “uniform in appearance” and “more intense” (Haitz; Column 5, Lines 37-43).

With respect to claim 8, Yeager et al. teaches a method for manufacture of a light emitting diode package comprising forming a one piece ceramic substrate 17 and cup 19 for mounting a light emitting diode 4, the one piece ceramic substrate and cup formed from an opaque ceramic material (Column 28, Lines 28-30) defining a cavity with a ceramic sidewall (Column 28, Lines 28-30), and the cavity having a bottom and a top (Figure 2), wherein the cavity is shaped to focus light in a predetermined direction (Figure 2), coating a portion of the

Art Unit: 2885

ceramic cavity with a light reflective material (21; Column 10, Lines 33-35), positioning a light emitting diode 4 on the substrate (Figure 2), and depositing an optically transparent material 11 in the cavity to protect the light emitting diode.

However, Yeager et al. fails to teach the sidewalls of the cavity being vertical.

Haitz teaches a method for manufacture of a light emitting diode package (Figure 4) with a ceramic substrate (16, 18; Column 4, Lines 58-60) for mounting a light emitting diode 12, the substrate defining a cavity with reflective, vertical sidewalls 21 shaped to focus light in a predetermined direction (Figures 3A and 4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yeager et al. with the teachings of Haitz because a cavity with vertical sidewalls would be "uniform in appearance" and "more intense" (Haitz; Column 5, Lines 37-43).

With respect to claims 15-17, Yeager et al. teaches the method wherein positioning the light emitting diode comprises determining a location between the bottom and the top of the cavity to locate the light emitting diode (Figure 1). It is an inherent characteristic of a light-emitting device to have a viewing angle. Based on the structure of the reference light emitting diode package, positioning the light emitting diode within the cavity will result in light emitting only within an angle created by the cavity. It is therefore inherent in the structure of the device that positioning the light emitting diode within the cavity will achieve a predetermined viewing angle of the light emitting diode while moving the light emitting diode closer to the bottom of the cavity will reduce the viewing angle and moving it closer to the top of the cavity will increase the viewing angle.

Art Unit: 2885

With respect to claim 18, Yeager et al. teaches the method wherein depositing the optically transparent material in the cavity to protect to light emitting diode comprises forming a domed layer 14 of the optically transparent material over the light emitting diode (Figure 2).

With respect to claim 25, Yeager et al. teaches a light emitting diode package comprising a ceramic one piece substrate 17 and cup 19 package for mounting a light emitting diode 4, the ceramic one piece substrate and cup package defining a cavity 19 with ceramic sidewalls (Column 10, Lines 28-30); and wherein the ceramic one piece substrate cup and package is formed from an opaque ceramic material (Column 10, Lines 28-30).

However, Yeager et al. fails to teach the sidewalls of the cavity being vertical.

Haitz teaches a light emitting diode package (Figure 4) with a ceramic substrate (16, 18; Column 4, Lines 58-60) for mounting a light emitting diode 12, the substrate defining a cavity with reflective, vertical sidewalls 21 shaped to focus light in a predetermined direction (Figures 3A and 4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yeager et al. with the teachings of Haitz because a cavity with vertical sidewalls would be "uniform in appearance" and "more intense" (Haitz; Column 5, Lines 37-43).

Claims 2-5 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeager et al. in view of Haitz as applied to claims 1 and 8 above and further in view of Ishinaga (US Patent 6,355,946).

Art Unit: 2885

With respect to claims 2-5, Yeager et al. in view of Haitz teaches the light emitting diode package as described in claim 1, but fails to explicitly state the shape of the cavity to be rectangular, trapezoidal, oval or circular shaped.

Ishinaga teaches the use of rectangular (Figure 8), trapezoidal (Figure 7), oval (Figure 2), and circular (Figure 12) shaped cavities.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Yeager et al. package with the teachings of Ishinaga because different shapes would provide different illumination patterns (Ishinaga; Figures 2, 7, 8, and 12).

With respect to claims 9-12, Yeager et al. in view of Haitz teaches the method for manufacture of a light emitting diode package as described in claim 8, but fails to explicitly state the shape of the cavity to be rectangular, trapezoidal, oval or circular shaped.

Ishinaga teaches the use of rectangular (Figure 8), trapezoidal (Figure 7), oval (Figure 2), and circular (Figure 12) shaped cavities.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the Yeager et al. method with the teachings of Ishinaga because different shapes would provide different illumination patterns (Ishinaga; Figures 2, 7, 8, and 12).

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yeager et al. in view of Haitz as described in claim 8 and further in view of Abe (US Patent 5,177,593).

With respect to claim 19, Yeager et al. in view of Haitz teaches the method as described above, but fails to teach the optically transparent material forming a concaved layer.

Abe teaches the method of depositing an optically transparent material 35 to protect a light emitting diode 33 comprises forming a concaved layer of the optically transparent material over the light emitting diode (Figure 4B).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Yeager et al. in view of Haitz with the concave layer from teachings of Abe because having a concaved layer over the LED provides the ability to focus the emitted light in a more concentrated area and the resin would provide "excellent adhesive property to a chip and also having excellent moisture and thermal resistance" (Abe; Column 33-37).

Claims 22, 24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeager et al. in view of Haitz as applied to claims 1 and 8 above, and further in view of Song et al. (US Patent 6,707,069).

With respect to claims 22 and 26, Yeager et al. in view of Haitz teaches the light emitting diode package as described above, but fails to teach the opaque ceramic material is an alumina or aluminum nitride based material.

Song et al. teaches a light emitting diode package with a light emitting diode 105 mounted to a ceramic substrate and cup (101,102) with a vertical sidewall (Column 2, Lines 48-51) wherein the opaque ceramic material is an alumina or aluminum nitride based material (Column 5, Lines 50-62).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the package of Yeager et al. in view of Haitz with the material from the teachings of Song et al. because alumina based ceramics "have high heat conductivity and a high heat



Art Unit: 2885

dissipation effect, thus effectively solving the problems of thermal degradation of LED packages and thermal stress of package bodies caused by heat radiated from LED chips” (Song et al.; Column 3, Lines 2-15).

With respect to claim 24, Yeager et al. in view of Haitz teaches the method of manufacture of a light emitting diode package as described above, but fails to teach the opaque ceramic material is an alumina or aluminum nitride based material.

Song et al. teaches a method of manufacture of a light emitting diode package with a light emitting diode 105 mounted to a ceramic substrate and cup (101,102) with a vertical sidewall (Column 2, Lines 48-51) wherein the opaque ceramic material is an alumina or aluminum nitride based material (Column 5, Lines 50-62).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the material from the teachings of Yeager et al. in view of Haitz with the teachings of Song et al. because “have high heat conductivity and a high heat dissipation effect, thus effectively solving the problems of thermal degradation of LED packages and thermal stress of package bodies caused by heat radiated from LED chips” (Song et al.; Column 3, Lines 2-15).

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yeager et al. in view of Haitz as applied to claim 8 above, and further in view of Shaddock (US 2002/0163001).

With respect to claim 23, Yeager et al. in view of Haitz teaches the method as described above, but fails to teach forming the substrate comprises using a die that can be stamped on the substrate.

Art Unit: 2885

Shaddock teaches mounting a light emitting diode 20 in a one piece substrate and cup 116 and forming the substrate comprises using a die that can be stamped on a sheet of material to form the one piece substrate and cup (Paragraph 21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Yeager et al. in view of Haitz with the stamping process from the teachings of Shaddock because stamping would “both cause the depression for the reflector cup and cut away windows to provide separation between the reflector cup and at least one lead” (Shaddock; Paragraph 17).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-5, 8-12, 15-19, and 22-26 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takekuma (US 2002/0158320) teaches a one piece ceramic substrate and cup LED.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Makiya whose telephone number is (571) 272-2273. The examiner can normally be reached on Monday-Friday 7:30am - 4:00pm (ET).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong-Suk (James) Lee can be reached on (571) 272-7044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2885

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DJM 10/25/2007



JONG-SUK (JAMES) LEE  
SUPERVISORY PATENT EXAMINER